Pacific Gas and Electric Company®

Energy Procurement
Renewable Energy
Development
245 Market Street, Room 1344
San Francisco, CA 94105-1702

Mailing Address
Mail Code N13W
P. O. Box 770000
San Francisco, CA 94177-0001

April 24, 2015

Ms. Michele Dermer
EPA Region 9, WTR-9
75 Hawthorne St.
San Francisco, CA 94105

Subject: February 2015 Monthly Report and Updated Evaluation of Annular Pressure Temperature Relationship
PG&E Test Injection/Withdrawal Well 1
Permit No. R9UIC-CA5-FY13-1
King Island, San Joaquin County, California

Dear Ms. Dermer:

PG&E has reviewed EPA's comments provided in their April 17, 2015 letter to PG&E regarding the two subject reports dated March 27 and April 1, 2015, respectively. Our responses to EPA's comments are provided below (response numbers match EPA's comment numbers).

1. **Part II.E.5.a and b, Attachment 1, Monitoring Device Data for I/W Well:**

PG&E did not include seconds in the time column of Attachment 1, which is consistent with the statement in Part II.E.3.a that seconds were optional. However, for the March 2015 and subsequent monthly reports, PG&E will provide the date and time in the Permit specified format for all test measurements. The data tables in the March Monthly Report tables will include the data since the beginning of the compression test (including February and March 2015) in the specified format.

2. **Part II.E.3.c, Attachment 2, Wellhead Tubing and Casing Annulus Data for Piacentine 1-27 Well:**

The measured increase in the Piacentine 1-27 tubing head pressures is due to the commencement of injection activities in February 2015. As previously indicated, the injection program is progressing somewhat more slowly than originally planned due to limitations of the surface injection equipment; however, the measured pressures in the well correlate closely with predicted pressures when analyzed based on the cumulative injection volume. Specifically, estimated bottomhole pressures in Piacentine 1-27 (calculated from wellhead pressure measurements using pressure gradient data) correlate closely with the bottomhole pressures predicted under the MODFLOW Sh2Kl case, which was presented as the most likely prediction scenario in the January 2015 re-

evaluation of the Zone of Endangering Influence (ZEI) (provided in Appendix A of Appendix V-6b of the Well Completion Report for the Injection/Withdrawal Well and Observation Wells dated January 28, 2015). At the end of February, the estimated bottomhole pressure and the predicted bottomhole pressure were both 1,953 psia. A chart showing the correlation between estimated and predicted bottomhole pressures in Piacentine 1-27 during the compression test will be presented in the March Monthly Report.

3. **Part II.D.6.c, Attachment 4, Annular Pressure/Temperature Changes Evaluation:**

    a. The "Tubing/Casing Annulus Pressure Excursions" document, which was an attachment to the cover letter titled: "Updated Evaluation of Annular Pressure-Temperature Relationship, PG&E Test Injection/Withdrawal Well 1", dated April 1, 2015, has been revised to include Exhibit 4A ("I/W Test Well Annulus Pressure Calculations based on the change in Water Density as a Function of Temperature"). Exhibit 4A represents an update to Exhibit 2 of Attachment 4 of the February 2015 Monthly Report. Please note that Exhibit 4A was included in the original April 1, 2015 submittal to EPA as a tab in the Excel spreadsheet provided as an electronic file in the accompanying CD. The Tubing/Casing Annulus Pressure Excursions document is attached.

    b. PG&E accepts 200 psia as the annular pressure limit for the I/W well on a contingent basis, with the understanding that should annular pressures exceeding 200 psia be measured, a higher pressure limit may be requested, if supported by pressure and temperature data analysis demonstrating that the annular pressure exceedance is not due to a loss of wellbore mechanical integrity.

4. **Part II.E.5.d.i, Fall-off Test Results, and Paragraph 5.d.ii, Attachment 7, Reservoir Pressure versus Cumulative Injection Volume Plots:**

    a. PG&E will provide separate reports for the first and second fall-off tests (FOTs), performed on February 17, 2015 (test data and analysis results were submitted to EPA on March 27, 2015) and April 1-3, 2015. The reports will include a discussion of the FOT results and the conclusions reached based on the analysis of the FOT results, and will be submitted to EPA on or before May 1, 2015.

    b. A graphic plot of static reservoir pressure versus cumulative injection volume over time will be provided in the report for the second FOT conducted on April 1-3, 2015.

The Tubing/Casing Annulus Pressure Excursions document is enclosed as one hard copy and as a PDF in a data CD. The document has also been uploaded to PG&E's Dropbox account, which can be accessed at the following link:

https://www.dropbox.com/sh/mf2qnl5v016e78f/AABIm-gfjIKWPpVCKe7hUgA6a?dl=0

If you have any questions regarding this submittal or require additional information, please feel free to contact me at (415) 973-6270.

Sincerely,

Mike Medeiros
Manager, Renewable Energy Development

Cc: Mr. James Walker, EPA Consultant
Mr. Michael Woods, Division of Oil, Gas and Geothermal Resources
Ms. Anne L. Olson, Central Valley Regional Water Quality Control Board

Enclosures: Data CD with response letter and attachment
Tubing/Casing Annulus Pressure Excursions